IN BRIEF

BEYOND THE SUPERCYCLE: HOW TECHNOLOGY IS RESHAPING RESOURCES

During the 2003–15 commodity supercycle, spending on resources including oil, natural gas, thermal coal, iron ore, and copper rose above 6 percent of global GDP for only the second time in a century before abruptly reversing course. Less noticed than these price gyrations have been fundamental changes in supply and demand for resources brought about by expected macroeconomic trends and less predictable technological innovation. Our analysis shows that these developments will have major effects on resource production and consumption over the next two decades, potentially delivering significant benefits to the global economy and bringing change to the resource sector.

- Rapid advances in automation technologies such as artificial intelligence, robotics, analytics, and the Internet of Things are beginning to transform the way resources are produced and consumed. The advent of electric and self-driving vehicles and ride sharing, greater use of energy-efficient technologies in factories, businesses, and homes, and the growth of renewable energy sources are changing demand for resources. For producers, technology-driven transformations including underwater robots that repair pipelines, drones that conduct preventive maintenance on utility lines, and the use of data analytics to identify new fields could raise productivity.
- Scenarios we modeled show that adoption of these technologies could unlock cost savings of between $900 billion and $1.6 trillion in 2035, equivalent to the GDP of Indonesia or, at the upper end, Canada. Total primary energy demand growth will slow or peak by 2035, despite growing GDP, according to our analysis. Reduced energy demand from transportation, the proliferation of energy efficiency measures, and increased substitution of fossil fuels enabled by cost reductions in renewables could account for as much as $1.2 trillion of the total savings in an accelerated technology adoption scenario. The potential supply-side savings for producers of the five commodities we focus on—oil, natural gas, thermal coal, iron ore, and copper—could amount to $300 billion to $400 billion annually in 2035.
- The price correlation that was evident during the supercycle is unraveling, and a divergence in prospects between growth commodities and declining ones may become more significant. Demand for oil, thermal coal, and iron ore could peak and potentially decline in the next two decades while copper's prospects remain buoyant, according to our analysis, although there may be regional differences. Advanced economies could experience a faster decline in demand for oil with rapid technological adoption, for example, while emerging economies may experience demand growth, regardless of the rate of technological change. However, the resource intensity of GDP growth is continuing to decline globally.
- Policy makers could capture the productivity benefits of this resource revolution by embracing technological change and allowing a nation's energy mix to shift freely, even as they address the disruptive effects of the transition on employment and demand. Resource exporting regions whose public finances rely on resource endowments will need to find alternative sources of revenue. Importers could stock up strategic reserves of commodities while prices are low, to safeguard against supply or price disruptions, and use the savings from avoided resource spending to invest in other areas.
- For resource companies, particularly incumbents, navigating a future with more uncertainty and fewer sources of growth will require a focus on agility. Harnessing digital and other technologies will be essential for unlocking productivity gains, but not sufficient. Companies that focus on the fundamentals—driving up throughput, driving down capital costs, spending, and labor costs—and look for opportunities in technology-driven areas may have an advantage. In the new commodity landscape, incumbents and attackers, including digitally enabled outsiders, will race to develop viable business models.

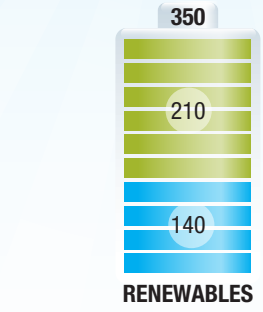
THE TECHNOLOGY REVOLUTION IN RESOURCES

Technological advances will change supply and demand dynamics in the resource sector, raising productivity, increasing energy efficiency, **and unlocking value to the global economy in 2035**

$900 billion to $1.6 trillion

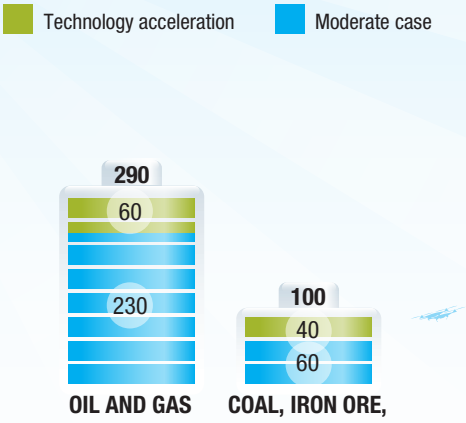
2035 run rate savings opportunity
$ billion 2015

Consumption of energy will become less intense as people use energy more efficiently in homes, businesses, and transportation.



Technological advances will help bring down the cost of renewable energies, such as solar and wind energy, partially displacing fossil fuels.

2035 increased productivity
$ billion 2015



Resource producers will be able to deploy a range of technologies including robotics, Internet of Things, and data analytics in their operations to raise productivity.

The impact of technology on 5 major commodities

OIL
Peak demand for oil could be in sight, as changes in transportation including electric and autonomous cars cut the energy intensity of transport fuel consumption.

NATURAL GAS
Demand could grow in the near term as economies decarbonize, but in the longer term, gas could face competition from renewables.

THERMAL COAL
Peak demand for coal is possible by 2020 as China pushes renewables to displace it in the power sector and natural gas advances with cost reduction and supply increases.

IRON ORE
Growth in demand for iron ore will decline as steel demand growth weakens and recycling gains ground.

COPPER
Copper's future looks buoyant, with a strong demand outlook including from the electronics industry, despite progress in efficiency in demand and supply.

MCKINSEY GLOBAL INSTITUTE

McKinsey&Company